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Shine, Maurice J.

Monterey, California: U.S. Naval Postgraduate School

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AN INVESTIGATION INTO THE CONTROL  
OF VEHICLE MAINTENANCE AND OPERATING  
COSTS AT SELECTED ACTIVITIES

MAURICE J. SHINE

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AN INVESTIGATION INTO THE CONTROL  
OF VEHICLE MAINTENANCE AND OPERATING COSTS  
AT SELECTED ACTIVITIES

\* \* \* \* \*

Maurice J. Shine





AN INVESTIGATION INTO THE CONTROL  
OF VEHICLE MAINTENANCE AND OPERATING COSTS  
AT SELECTED ACTIVITIES

by

Maurice J. Shine

Lieutenant Commander, United States Navy

Submitted in partial fulfillment of  
the requirements for the degree of

MASTER OF SCIENCE

IN

MANAGEMENT

United States Naval Postgraduate School  
Monterey, California

1964

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## ABSTRACT

This study discusses the various connotations of the concept of control. Technical control as exercised by the Comptroller of the Navy and the Chief, Bureau of Yards and Docks, is traced as it relates to the transportation function in the Navy. Following a brief description of the Industrial Fund, the techniques employed in the control of vehicle maintenance and operating costs at three activities are analyzed.

Whether they be operating at an appropriation, industrial or modified-industrial funded activity, transportation managers can, if they take the initiative, effectively and economically control these costs.



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## CHAPTER I

### CONTROL

"Control in the last analysis must always be completed effective action."<sup>1</sup>

#### INTRODUCTION

At the outset of this study it was the author's premise that managers, operating under the inherent cost consciousness of industrial funding, would be motivated to control costs and operate more economically than a contemporary managing under appropriated funds. The following study somewhat tempered this premise.

The management of transportation assets is a dynamic responsibility which involves many interesting facets, some of which, regrettably, are beyond the scope of this study. Such interesting features as preventive maintenance (its effectiveness, scheduling, servicing and problems of over-maintenance), Bureau of Yards and Docks standards, repair limits and economic vehicle life expectancy as well as vehicle allowance, requirements and utilization, of necessity, must be eliminated.

Discussion will be limited to the concept of control, the exercise of technical control both by the Comptroller

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<sup>1</sup>Victor Z. Brink, "The Controller's Management Role," The Controller (September, 1960), p. 404.



of the Navy and by the Chief, Bureau of Yards and Docks, as they fulfill their assigned responsibilities.

Following a brief discussion of Industrial Fund applications in the Navy, the vehicle cost control at three activities will be analyzed in an attempt to objectively evaluate management performance in this area.

There have been recent changes in report format, information contained therein and in broad guidelines within the Transportation Maintenance Management Program; these changes, however, do not materially effect the results of this study.

#### THE CONCEPT OF CONTROL

Modern scientific management rests on the foundations of well-defined objectives, planned programs and controlled performance. Controlled performance is attained by the establishment of standards, the measurement of performance and the correction of deviations.<sup>2</sup> In the broad sense, control really encompasses all functions of management and comprises those specific functions which enable management to effectively and efficiently direct the efforts of the organization toward the accomplishment of planned objectives.

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<sup>2</sup>L. B. Sawyer, "The Anatomy of Control", The Internal Auditor, (Spring, 1964), 15.



To assist in his understanding of the meaning of the word "control", the manager must know the definition of the word itself. The noun control means "a directing or restraining domination; anything which affords a standard". As a verb it means "to check or regulate".<sup>3</sup>

Definitions of managerial control with its varied shades of meaning are numerous, expressed differently and often conflicting. Control, interwoven with all other functions, does not stand alone; it must be considered in relation to the goals that management is trying to achieve. Of its very nature the concept assumes that things will go wrong and, should plans go awry, it facilitates corrective action by affixing individual responsibilities.

Since control "regulates" and attempts to produce results which would not occur by themselves, it is usually unpopular because it makes people do something that they probably would not otherwise do; consequently, its connotation implies a certain restriction of freedom.<sup>4</sup>

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<sup>3</sup>Clarence L. Barnhart (ed.), The American College Encyclopedic Dictionary (Chicago: Spencer Press, Inc., 1957), Vol. I, 264.

<sup>4</sup>Franklin G. Moore, Management-Organization and Practice (New York: Harper and Row Publishers, 1964), p. 201.





To successfully employ the control process the manager must (1) determine what is being accomplished through "on the scene" observation and/or progress reports, (2) evaluate performance, (3) apply corrective measures so that performance is as planned, and (4) "follow up" action taken. Hamilton sees the control technique as requiring four logical steps. In addition to establishing basic objectives, long and short range, the manager must decide on a plan of operation by which these objectives will be progressively attained; then, having incorporated yardsticks by which performance may be measured, he must implement the plan and control results so as to accomplish the planned objectives.<sup>5</sup>

What then are the concepts evolving from the combination of words like "management control", "executive control", "internal control" and "technical control"? The first two seem to imply a method of management, a plan, a function, a managerial technique, a means of directing oneself and an organization toward its broad goals. Authorities define these concepts in different, many times divergent, ways. The author will attempt to synthesize these varied ideas.

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<sup>5</sup>Douglas L. Hamilton, "The Changing Role of the Controller," The Journal of Accountancy, (January, 1960), 54.





## MANAGEMENT CONTROL

That function directed toward the achievement of all objectives. It is the employment of appropriate means by management and supervisory personnel to direct, restrain, govern, and check on the activities for which they are responsible, so as to achieve those objectives. Management control includes "executive" and "internal" control.<sup>6</sup> Thurston agrees that management control is a broad term which includes internal control.<sup>7</sup>

## EXECUTIVE CONTROL

That function directed toward the achievement of broad objectives. It is the employment of appropriate means by policy-making officers to direct, restrain, govern, and check activities for the purpose of achieving those broad objectives. The means used include long range plans, formulation of detailed objectives, budgets and forecasts, broad policy statements, charts of organization, and statements of function and responsibility.<sup>8</sup>

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<sup>6</sup>Sawyer, op. cit., p. 16.

<sup>7</sup>John B. Thurston, Basic Internal Auditing Principles and Technique (Pennsylvania: International Textbook Company, 1949), p. 8.

<sup>8</sup>Sawyer, loc. cit.



Two predominant areas, organizational and operational planning, are included within this function. The former includes the allocating of responsibility either by organization chart or by job description, this planning is dynamic in nature and must span the continuum from organization creation throughout its life. The latter covers the total range of operational activity, such as activity goals, evaluation of performance and policies, and procedures by which people will be controlled. Control, viewed from its direct relationship with planning, includes:

1. The establishment of the bases of control which may take the form of measurable standards, broad management policy, and formal requirements or limitations of authority.
2. Maintenance of adequate current planning - both to keep existing plans and controls up to date and to develop new ones as needed.
3. Adequate current coordination and communication in all aspects of actual performance.
4. Provision for decisions on a timely basis as required by specific situations which develop.<sup>9</sup>

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<sup>9</sup>Brink, op. cit., pp. 403-404.



## INTERNAL CONTROL

As for the meaning of "internal control" one author points out that this concept of control should never be confused with "management" or "executive" control. The latter two types, he says, are primarily concerned with the attainment of a balance among the various functions of a firm, whereas the former tends to stress efficient performance within each function. Insuring that lower management carries out its commission from top management is the purpose of this control.<sup>10</sup>

The function then is directed toward the achievement of detailed objectives. It is the employment of appropriate means at all levels of management and supervision to direct, restrain, govern, and check on those activities for which they are responsible, for the purpose of achieving those detailed objectives. Internal control includes financial (or accounting) control and administrative (or operational) control.<sup>11</sup>

In its Statements on Auditing Procedure No. 29, the American Institute of Certified Public Accountants authoritatively defines internal control as:

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<sup>10</sup>William Travers Jerome III, Executive Control - The Catalyst (New York: John Wiley and Sons, 1961), p. 75.

<sup>11</sup>Sawyer, loc. cit.





". . .the plan of organization and all of the co-ordinate methods and measures adopted. . .to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage adherence to prescribed managerial policies."

Stetler views internal control as a term which encompasses both "internal check" and "internal auditing". Internal check, through the accounting system should (1) assure that reliable, current and adequate accounting information is available to decision makers, (2) protect resources, and (3) facilitate compliance with management decisions and policies.<sup>12</sup> Internal auditing will be discussed later.

#### FINANCIAL CONTROL

The Institute implies that "accounting control" is concerned with the safeguarding of assets, reliability of financial records, segregation of record keeping and accounting reports from operations and asset custody, physical asset control and internal auditing. This function should include departmental budgets and forecasts and the use of systems of authorization and approval.<sup>13</sup>

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<sup>12</sup>Howard F. Stetler, C.P.A. Auditing Principles (New Jersey: Prentice-Hall, Inc., 1956), p. 34.

<sup>13</sup>Sawyer, op. cit., p. 16.





### ADMINISTRATIVE CONTROL

That function which includes the use of directives, job assignment sheets, reports, production schedules, performance standards, logs, registers, charts, forms, records and check lists.<sup>14</sup>

This subdivision, the Institute states, is mainly concerned with operational efficiency and adherence to managerial policies. It includes statistical analyses, quality control, time and motion studies, performance reports and training programs.

### TECHNICAL CONTROL

This control is that specialized or professional guidance which is exercised by an authority in technical matters. In the following chapters this "technical control" concept will be discussed as it applies to the Comptroller of the Navy in financial matters and to the Bureau of Yards and Docks in the acquisition, assignment, replacement, operation and maintenance of automotive vehicles in the Navy.

No matter how one controls, whether it be personally at the scene, by telephone, or by reports, the essence of

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<sup>14</sup>Ibid.



the function is the comparison and evaluation of actual against expected performance.

### PERSONNEL

Many managers fail to realize that few control systems will function without people, properly developed and trained to produce the required, adequate analytical effort. "People", comments Dearden, "not reports, make a control system effective."<sup>15</sup>

It is from this most important ingredient in the control process that reports are received. The reliability and effectiveness of these reports depend, in no small measure, on the caliber and integrity of those initiating the "feedback" information which becomes a major tool for control action.

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<sup>15</sup>John Dearden, Cost and Budget Analysis (New Jersey: Prentice-Hall, Inc., 1962), p. 176.



## CHAPTER II

### TECHNICAL CONTROL APPLIED

#### THE NAVY COMPTROLLER

The Navy, recognizing the control function as a valuable financial management tool dealing "with those analyses, forecasts, records, reports and procedures that have a bearing on the organization's financial status in relation to its mission",<sup>1</sup> established the Office of the Navy Comptroller in June 1950. The charter of the Comptroller assigns responsibility in areas which include coordination, budgeting, accounting, program analysis, auditing, progress and statistical reporting, financial organization and related procedures.

Overall authority and responsibility for financial management in the Navy is vested in the Comptroller who provides the Secretary of the Navy and other officials with analyses and reports on status, trends and progress of Navy programs as related to the financial plan.

His authority is exercised essentially through the medium of technical control. The financial management field is the specialty of the Navy Comptroller and, in this

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<sup>1</sup>Department of the Navy, Financial Management In The Navy (Washington: Bureau of Naval Personnel, NavPers 10792-A, 1962), 17.





area, he issues broad guidelines which apply to all fiscal units regardless of the source of their management control by separate bureaus. Individual activities must comply with these directives through their established command lines.

One can see the threads of management and executive control as the Comptroller, acting in the name of the Secretary of the Navy, issues technical guidance and direction in financial matters throughout the Naval Establishment. This control provides for (1) meeting legislative requirements of Congress as well as the Office of the Secretary of Defense, Bureau of the Budget and Treasury Department, (2) classification of Navy programs and objectives, and (3) budget plans. The internal control concept is exemplified in the Comptroller's current summary program schedules for budget formulation, review and execution, accounting and statistical data, and the conduct of audits.

Certain operations such as disbursing, formulation of budget estimates, maintenance of accounting ledgers, progress reports and statistics are decentralized to the bureaus and offices and, through them, to field activities. The Navy Comptroller Manual contains instructions in the various disbursing, cost accounting and appropriation or





fund accounting areas which are binding on the entire Navy.<sup>2</sup>

Technical control is exercised by the Comptroller over these decentralized fiscal operations. It includes authority and duty to (1) prescribe financial policies and procedures, (2) require compliance, and, (3) review or audit performance of functions. He is responsible for coordinating and integrating financial functions to provide the Secretary of the Navy with an efficient, economical and effective financial management system.

Because of their relevance to this study, the subjects of budgeting, accounting, program analysis and auditing will be briefly discussed.

### Performance Budgeting

Introduced with the National Security Act Amendments of 1949<sup>3</sup> the performance budget concept seeks to answer the following simple questions: "What must be done?" "What has been accomplished?" "How much did it cost?" Such a concept, regardless of the level at which it is employed, requires a budget plan, a cost accounting system, and a set of standards against which to measure performance.

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<sup>2</sup>Department of the Navy, Office of the Comptroller. Navy Comptroller Manual, Volumes 1 through 8.

<sup>3</sup>U. S. Statutes, Public Law 216, 81st Congress, 1949.



Budgeting is a dynamic process involving many variables, some of which are, many times, "ball park" guesses. The more closely budget estimates are tied to a mechanism for measuring work and costs the more reliable are the resulting estimates; forecasts of their very nature, however, are based on variables which are for the most part, not under the control of the estimator.

The Comptroller has responsibilities for both budget formulation and execution. During the formulation phase of the budget process, in addition to other duties, he prescribes Navy-wide policies and procedures and provides guidelines for budget preparation. During execution, he conducts a continuous review of the execution of approved plans and programs while simultaneously studying the appropriation structure, budget practices and procedures of all activities within the Navy.

Finally, the Comptroller is responsible for coordination and submission of the Navy's budget through the Secretary of Defense, Bureau of the Budget and the Congress. This responsibility might well be considered a top-level management function and as such rightfully would fall in the "executive" control category.

#### Accounting

The Comptroller develops, prescribes and supervises



execution of principles, policies and procedures in fiscal cost, capital and operating property and in working capital and management funds accounting. Such an accounting system must necessarily "give not only full disclosure of financial operations but also the information needed for effective internal management. . ."<sup>4</sup>

A complete cost accounting system has been installed in the Navy with basic instructions contained in the Navy Comptroller Manual. The primary objective of this system is the accumulation of actual cost related to work performed and end products. Generated costs form the basis for performance budgeting and provide management with a tool for financial control. Complete cost figures, when properly presented and interpreted, can provide:

1. A basis for measuring accomplishments against planned objectives by supplying reports which reflect full costs of carrying out programs and activities.
2. Indication of areas of accountability and responsibility measured against performance standards.
3. Reports which reflect costs accruing to specific jobs.

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<sup>4</sup>Arthur Smithies, The Budgetary Process in the United States (New York: McGraw-Hill Book Company, Inc., 1955), p. 89.





4. Timely and useful financial data which allows responsive control.

In addition to the above, the Navy Comptroller is charged with the development of policies and procedures for industrial fund financing, as well as the development and coordination of applicable accounting data processing techniques.

#### Program Analysis

The Comptroller's responsibility in this area embraces the development, coordination and implementation of systems for analysis of costs, fiscal controls and accounting as related to the budget. He must evaluate performance, compare trends and programs and provide appropriate analysis for intelligent decision-making. To support these analyses he plans, directs and presents applicable economic studies to support budget requests.

#### Auditing

In his responsibility as internal auditor, the Comptroller provides an independent and objective appraisal of controls and accountability used by all activities in the Navy.

In 1963, the Comptroller of the Navy directed the Navy Area Audit Office, San Francisco, to conduct a





regional audit of the utilization and maintenance of passenger carrying and general purpose vehicles at selected activities in the Twelfth Naval District. The principal objectives of the audit were to provide an independent appraisal of the utilization, maintenance and operation of transportation equipment, establish the accuracy and reliability of the transportation management reports, and determine the use of these reports by local management. Audit conclusions concerning vehicle utilization, consolidation, and cost comparisons are very interesting indeed.

Parallel to the internal audit program he conducts a supplementary program of internal review which is designed to insure continuous personal attention to fiscal operations. In essence this program allows the various management bureaus to check accuracy of accounting data, operational efficiency and adherence to policies and procedures prior to an internal audit by the Comptroller.

#### BUREAU OF YARDS AND DOCKS

Since Navy Regulations assign to the Bureau of Yards and Docks technical control over the repair, maintenance procedures and operating standards for transportation, it has developed a program for the management of transportation assets. Basically, the program provides a system for



recording, reporting and evaluating the utilization and maintenance of automotive equipment. Reports are produced to enable the Navy to obtain safe and serviceable transportation requirements economically, to ensure the maximum useful service life of the equipment, to operate and maintain equipment efficiently and, thereby, to effectively validate transportation budget requirements.

#### THE NAVY TRANSPORTATION MAINTENANCE MANAGEMENT PROGRAM

Program responsibilities are assigned by the Secretary of the Navy. The Chief of Naval Operations is responsible for the final approval of vehicle allowances with the District Commandants responsible for establishing individual activity allowances. The Bureau of Yards and Docks, represented by the local District Public Works Officer, has technical control over acquisition, assignment, replacement, operation and maintenance of automotive vehicles. Management bureaus and offices fund the operation and maintenance of vehicles as a part of field activity operating allotments.

The program employs a uniform cost and statistical accounting system which was developed jointly by the Office of the Comptroller, Navy Department, and the Bureau of Yards and Docks. This system, developed to carry out the assigned responsibility as well as to provide a uniform



method for recording costs through the development of cost control and statistical codes, provides for the collection of cost and statistical data on hours, cost of labor, and the cost of material under classifications which specifically identify these expenditures to an end use. These classifications identify the costs with a specific type of equipment or an overhead function not specifically identified with an equipment type where the expenditure must be distributed.

Detailed guidelines are provided on the following:

1. Cost control system - appropriate definitions, accounting and statistical codes and required management reports.
2. Work generation and authorizations - preventive maintenance, interim repairs and methods for handling various types of authorizations.
3. Shop Repair Order instructions - description, purpose and use.
4. Procurement, material inventory control and material issues.
5. Cost Accounting - labor, material and overhead.
6. Statistical cost analysis - based on mileage, age and period mileage components which relate total and periodic miles traveled to a standard hour





maintenance input for vehicles by code designator.<sup>5</sup>

### Management Reports

The major control tool, produced by the cost and statistical accounting system, is a series of management reports which provide cost and hour data identified with specific equipment types and essential elements of overhead together with established performance standards, both commercial and military, which enable management to appraise performance and discover deficiencies.

Generated reports are designed to provide (1) information on the productivity of maintenance shop personnel (actual versus standard hours); (2) data on overhead costs; (3) comparison between activity costs and commercial contract costs; (4) comparison between actual direct labor hours expended and established maintenance input standards; and (5) comparison between actual and standard maintenance costs.

Local managers, through proper analysis and evaluation of the data contained in these reports, are enabled to (1) intelligently manage transportation assets based on cost

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<sup>5</sup>Department of the Navy, The Transportation Equipment Cost Accounting Handbook (Washington: Bureau of Yards and Docks, NAVEXOS 1502, 1960), passim.





and mileage data, (2) measure and compare effectiveness, (3) determine basic causes of variance, (4) take timely corrective action, and (5) validate activity budget requirements.<sup>6</sup>

#### Staff Assistance

Representing the Bureau of Yards and Docks local staff assistance teams from the District Public Works Office visit and assist activities in order to review procedures and effect improvements in Transportation Maintenance Management Program procedures.

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<sup>6</sup>Department of the Navy, Management of Transportation Equipment (Washington: Bureau of Yards and Docks, NAVDOCKS P-300, 1962), 92-93.



## CHAPTER III

### THE INDUSTRIAL FUND

The Navy Industrial Fund Program, nurtured by the enthusiastic acceptance accorded it by management, has grown from a revolutionary experiment in government fiscal operations to a stature of prominence within the fiscal structure of the Navy.

#### --The Navy Industrial Fund Program

#### BACKGROUND

Since the National Security Act Amendments of 1949, industrial type activities in the Navy Department have used working capital provided by revolving funds, called "industrial funds", to finance production of goods and services ordered by their customers on a reimbursable basis.

A "buyer-seller" relationship is created between a producer of goods and services and its customers. The existence of such a relationship is marked by the issuance of individual orders by the "buyer" for specific products or services and their acceptance for performance by a "seller" activity at an agreed price to be paid by the buyer. It is necessary that the buyer be accountable for the funds used to pay for the cost of products or services he orders. The "buyer" or "customer" may or may not be the ultimate consumer or user; he may be a commodity command, a national inventory control manager, a weapons



system manager, a project manager, or other official within a command or bureau that has been delegated the immediate and direct management responsibility for ordering such products or services to execute a program. The real value is realized in executing work under specific "contract", a method of operation which gives appropriate recognition to the different roles of the customer and producer.

Specific management objectives include:

1. More responsive performance to the needs of the buyer activities when they otherwise would be unable to negotiate and handicapped in ordering the specific work or services to be furnished, by the fact that they are not funded and able to pay for it. This would require more effective programming, and budgeting for the specific work or services required, and improved flexibility in making program changes.
2. Greater flexibility in varying the work force of an industrial-type activity directly responsive to workloads imposed. This can result in lower unit costs of production. Under the budgetary-relationship, the work force tends to be stabilized without changes corresponding to variations in the workload, either up or down.





3. Achievement of lower unit costs of production as a result of the buyer's position of critic and the use of predetermined fixed prices established on a quasi-contractual basis to the greatest extent feasible.
4. Facilitate increased cross-servicing to other agencies with more economical use of facilities to avoid unnecessary duplication.<sup>1</sup>

The first two of these management objectives are closely related in practice. Accomplishment of the third - lower unit cost of production - depends on requiring the customers of industrial-fund activities to be accountable for the financial resources used to pay for the products and services they order. It is expected that customers' funds will be limited and that they will be motivated to obtain required products and services for the least cost. There is incentive also for the customer, interested in conserving his funds, to order only those products and services which he needs.

If all customers of industrial-fund activities fulfilled their responsibilities as "buyers" by being specific

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<sup>1</sup>Frank E. Stone, "Economy in Industrial-and Commercial-Type Activities Fostered by Use of Revolving Funds," The Armed Forces Comptroller, Vol. VIII No. 2 (June, 1963), 16-17.





as to requirements and critical of performance and costs, the incentives for better management of the industrial activities would induce greater improvements in performance and cost savings than directives or commands from higher echelons could ever achieve.<sup>2</sup>

It appears obvious that the arrangement requiring negotiation between industrial-type activities and their customers for services to be performed at a price removes financial barriers to cross-servicing that exist where operation of the producing activity is controlled by a higher command through budgetary relationship.

Adoption of this concept has required constant refinement of the installed accounting system. Primary examples of procedural advantages include ability to: (1) use accounting procedures for developing costs of specific goods and services produced, as opposed to merely accounting for obligations and disbursements incurred by the producing activity for materials procured, personal services, and various elements of overhead expenses, without references to end-products; (2) effect reimbursements for goods or services furnished to other activities without the inhibitions of funding limitations; (3) finance inventories of materials,

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<sup>2</sup>Ibid. p. 18.



supplies and work in process; and (4) produce financial statements which stimulate cost consciousness and a corresponding motivation to economy.

In addition to the specific objectives mentioned earlier, financial and physical control of production materials is improved by assigning inventory control responsibilities to the activity manager. In this "industrial businessman" role, he controls the purchase and accounting of required materials and, with an inherent motivation to cut costs, he purchases most economically. Aware, then, of his total inventory investment the activity manager is more strongly motivated to reduce waste and pass savings to his customer in the form of lower job costs.

Under such an operation it will be possible to compare costs and to develop a healthy spirit of cost competition between activities of a similar nature. Costly operations become immediately apparent and timely action can be taken to determine the reason for any high costs. It should not be long until management improves, plant lay-out changes indicated, and the personnel employed in high-cost installations brought to realize that their continued livelihood would depend on improvement in efficiency and a resultant lowering of costs.<sup>3</sup>

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<sup>3</sup>Ibid. p. 19.



This type funding provides incentives for better management of program execution and of production operations to meet requirements imposed by customers.

#### MARRIAGE AT THE LOWEST ECHELON

The Navy has used industrial funds to finance the operations of shipyards, the Military Sea Transportation Service, ordnance plants, selected laboratories, printing plants and other activities.

This concept was married to the single function of transportation when, in 1957, the Public Works Transportation Center, at Treasure Island, California, was changed from an appropriated fund activity to one operating under the industrial fund. With a specialized mission confined to transportation operations, the Center provides transportation services on a rental or contract basis to Activities in the San Francisco Bay Area at costs substantially less than costs incurred by activities which maintain and operate their own vehicle fleets.

This singleness of purpose, although it does involve considerable funds, allows the activity to be somewhat "easier to manage" in an atmosphere which allows management personnel to give their full attention to all costs involved in the transportation function.





During fiscal year 1963 the Center operated at approximately fifty-five percent of one shift capacity. Since it received maintenance of Reserve Industrial Facilities (MORIF) support funds from the Bureau of Yards and Docks in that year, the Center was permitted to reduce billing rates for labor by about fifty cents per hour. The Center's transportation services and facilities are available to, but not used to any significant extent by, major Naval activities which operate independent fleets resulting in consequent duplication.

In addition to its other services the Center engages in overhaul and maintenance of all types of automotive equipment. Through its industrial funding, the Center was able to increase "cross servicing" when, in fiscal 1963, the United States Air Force, recognizing that the Center could overhaul Jet fuel tankers more economically than either military or civilian competitors, contracted for work totalling \$735,000 (about forty percent of the Center's annual total revenue).

Faced with a reduction of this Air Force work in fiscal 1964 as well as by a reduction (by half) of the MORIF funds the Center was forced to solicit any business in the field of transportation since its livelihood depends on continued business - this furnishes the needed broad base of direct





labor hours over which indirect costs are distributed - and economy of operations.

Should future work load not materialize the Center's vehicle operating costs will increase because of an increased ratio of overhead expenses to direct labor. The financial statements for fiscal year 1963 indicate that the rental rates in effect resulted in full recovery of costs. These rental rates, cited in Chapter IV, are used as a basis for indicating economies.



CHAPTER IV  
AN ANALYSIS OF COST CONTROL  
AT SELECTED ACTIVITIES

ACTIVITIES STUDIED

The activities chosen for this analysis include the Public Works Transportation Center, a typical U. S. Naval Air Station and a U. S. Naval Ammunition Depot. The control of transportation costs at these activities ranges from very little at the activity where transportation is considered a subsidiary function of the main mission to major emphasis at Public Works Transportation Center where transportation is the primary mission.

These activities operate under Industrial (Public Works Transportation Center), Appropriated (Naval Air Station) and Modified-Industrial (Naval Ammunition Depot) funding. The depot, as a modified-industrial, operates transportation out of appropriated funds. This facilitates analysis and comparison between the Naval Air Station and the Ammunition Depot as distinguished from the pure industrial funded Public Works Transportation Center.

Preliminary to any comparative cost analysis certain elements must be considered:

1. The basic missions of compared activities are substantially different. The transportation function,



depending on its considered importance at the activity, receives different degrees of management attention.

2. These three activities maintain and operate vehicle fleets which differ considerably in composition but are utilized under similar road and weather conditions. The Public Works Transportation Center operates the largest fleet; it is, however, below average in heavy equipments and above average in light vehicles.
3. A substantial part of the vehicle inventory is made up of equipments approaching, and in some cases beyond, their economic life. Average age of these vehicles varies at all three activities. Repair limits are frequently exceeded without authority and unauthorized repairs are accomplished on vehicles beyond economic use. The cost of these repairs often exceeds the vehicle value. Continued use of overaged and high mileage vehicles places an undue burden on activity operating funds as they become increasingly difficult and costly to operate.
4. The different labor costs at the activities have been properly weighted for purposes of equitable inter-activity cost comparisons.



Contrary to the author's initial impression, a simple comparison of total maintenance costs does not disclose the true management picture. This is mainly attributed to the varied compositions of equipment inventory and the complexity of the cost elements involved.

#### THE TOTAL COST SPECTRUM

Vehicle cost elements receive substantially different degrees of management attention; major emphasis is placed on maintenance costs which are analyzed by the District Public Works Officer and the Bureau of Yards and Docks. Direct operating costs, mainly controlled through (1) close scrutiny over dispatching (planning and control), (2) reduction of maintenance and accident repair down-time, (3) minimum vehicle inventories, and (4) proper assignment of "pool" vehicles, are reviewed by the District Public Works Officer and compared with Navy averages.

Since the Bureau of Yards and Docks emphasizes control of maintenance and direct operating costs by requiring activities to submit reports on these two elements, there is a tendency to discuss cost in these terms alone and to largely disregard operating overhead. This overhead includes such items as shop supervision, janitorial services, cost clerk expense, cleaning and miscellaneous supplies, safety, etc. Subject only to evaluation at the activity





and review by the District Public Works Officer, these costs are locally controlled but are not compared to program criteria. That they are not as closely scrutinized as are maintenance and direct operating costs could well account for the extreme variations. This overhead element must have the continuing attention of local management in order to insure economical operations. It appears possible that these continuing, excessive indirect costs could easily be attributed to a lack of independent management review.

#### COST PER THOUSAND MILES

If vehicle cost control at different activities is to be the criterion for evaluating management effectiveness, the entire spectrum of costs must be included in the analysis. Valid comparisons may be made if total costs of the transportation program are considered on a cost per thousand mile basis.

With vehicle inventory composition so diverse at the activities studied, only sedans and pick-up trucks are considered comparable and will be subjected to a detailed analysis.

The following Table exhibits total cost information presented on a cost per thousand mile basis - the common denominator against which management of maintenance and operating costs will be evaluated.



TABLE 1

COST PER THOUSAND MILES  
FISCAL YEAR 1963

SEDANS (CODE 0105)				PICK-UP TRUCKS (CODE 0313)			
	PWTC	NAS	NAD		PWTC	NAS	NAD
Average Vehicle Inventory	109	23	5		122	99	91
Miles Operated (Thousands)	1,627.0	212.5	46.6		1,027.0	854.7	896.7
Average Miles per vehicle (Thousands)	14.9	9.2	9.3		8.4	8.6	9.9
Maintenance	\$ 17.03	\$ 19.72	\$ 28.59		\$ 15.98	\$ 23.91	\$ 15.55
Operation	20.72	23.54	21.24		24.16	30.73	23.68
Indirect (a)	15.51	19.54	20.80		23.53	24.45	14.45
Minor Misc. Charges (Prorated) (b)	-	9.28	.53		-	9.28	.53
TOTAL	\$ 53.26	\$ 72.08	\$ 71.16		\$ 63.67	\$ 88.37	\$ 54.21

(a) Includes direct cost of operation dispatcher and service station attendants, overhead and indirect charges. Note: Costs are prorated by the formula:  
Indirect material plus indirect labor

Direct Labor Dollars

(b) Minor charges include minor miscellaneous charges (0027), accident repair (0028) and radio repair (0029).

(Extract from Consolidated Report of Regional Audit conducted by Navy Area Audit Office, San Francisco, California, 1963.)



## OBSERVATIONS FROM TABLE 1

As is quite clear from a close analysis the costs incurred vary significantly; this wide range reflects disparities in the degree of efficiency and economy practiced at the activities.

PWTC - The Center maintained and operated sedans more economically than the other two activities. The total cost for pick-up trucks was \$9.46 more than NAD but \$24.70 less than NAS. Considering these two types together the Center accomplished the most economical operation.

There is some validity to the argument that the activity operating a substantially larger volume of vehicles can maintain and operate them more efficiently and economically than a smaller activity. One can take either side of this argument because in the last analysis "it really boils down to how well you manage your shop".

NAS - Charges for minor miscellaneous work are unusually high and it appears that reported maintenance costs are understated by unwarranted allocations to minor work. By definition "minor maintenance" involves work not large enough to justify preparation of a shop repair order and generally requires less than three tenths of an hour to accomplish.







NAD - Operating at only twenty-two percent the capacity of NAS the Depot was able to maintain and operate its sedans more economically. In the pick-up truck area the Depot operated more economically than either of the other two activities. The Table indicates that maintenance, operation and indirect cost control is expert in the management of pick-ups. Total cost differential in this cost control ranges from \$34.16 less per thousand miles when compared to NAS (fleets are about equal) and \$9.46 less than PWTC which operates a fleet about thirty percent again as large as that at NAD.

#### INDICATED ECONOMIES

During 1963, the PWTC monthly rental rate per thousand miles of operation was \$50.20 for sedans and \$42.80 for pick-ups. These rates resulted in complete recovery of full maintenance and operating costs less depreciation. The Naval Air Station operated its sedans 212.5 thousand miles at a cost of \$72.08 per thousand and its pick-up trucks 854.7 thousand miles at a cost of \$88.37 per thousand. Potential savings, had this activity rented its sedans and pick-ups from the Public Works Transportation Center, would total \$43,598 for these two types. Economies in other areas, not within the scope of this study, are recommended in the Regional Audit Report.



## UTILIZATION OF AVAILABLE CONTROLS

Public Works Transportation Center - Financed by an industrial fund, the Transportation Center operates within a structure which produces timely cost information. All responsible personnel including the Officer in Charge, the Comptroller, the maintenance shop superintendent and operations superintendent actively participate in transportation management.

With constant emphasis on full recovery of all costs management personnel participate in budget projections, staffing level, and personnel adjustments utilizing all available cost information. Managers are continuously searching for new ways to cut costs. Exhaustive studies of personnel requirements and vehicle utilization have fostered money-saving decisions.<sup>1</sup> It is a stimulating experience indeed to observe the managers at this activity as they "eat, live and sleep" cost control. Based on the major emphasis it receives, the control of overhead may well be considered to be a primary function of all supervisory personnel.

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<sup>1</sup>The Center was prime mover in March 1963 for a contract with the Alameda-Contra Costa Transit District to provide commercial bus service at Treasure Island. This service resulted in the discontinuance of shuttle bus runs between the hours of 2300-0500 daily and booster service during daylight hours. This represents a savings of approximately \$25,000 per year.



The shop repair orders, the basic documents for maintenance cost control, are tightly controlled and individually inspected. Costs are collected daily by equipment code and cost center (normally previous day's costs are balanced by 2 p.m. following day). This responsive timely information is compared against standards and should any discrepancy between standard and actual performance exist, responsibility is located and corrective action taken. If mechanics fail to accomplish "flat rate" they are discharged for inferior work.

Fiscal reports are prepared by the Comptroller; he conducts the independent review of work, as well as numerous other appropriate internal checks.

To assist the maintenance superintendent in planning his workload the Comptroller, based on projected rental income, assigns a target number of maintenance hours (normally 1,800 hours for 21 working days) per month. The superintendent then is free to choose the area (vehicle code) within which to expend the allotted time.

The Center works on a "pre-determined" shop rate which recovers fiscal and industrial relations costs; these are not included in other activities' shop rate. When the shop rate is used as a single criterion to compare effectiveness it can easily be misleading if the reader does not understand its complexity. One can easily see that it is





invalid to conclude that simply because the shop rate is lower vehicle maintenance costs are less. Quality of supervision and work performed are very important considerations in this instance. One does not manage most economically if a maintenance job requires two shop trips at a rate of \$5.39/hr. vice one trip at say \$6.00/hr. or even higher. Maintenance personnel in both shops work against the same standard and it is assumed that output is comparable.

U. S. Naval Air Station - With transportation financed by appropriated funds this activity formulates budget requests on the basis of preceding fiscal year's allocation rather than on generated cost information available from the management program.

Management personnel, other than those in the Public Works Department, usually do not participate in the evaluation of performance or in reviews and analyses of reports and records produced by the program.

All costs, direct and indirect, are controlled "after the fact" (subsequent to each monthly report for first two months in the quarter). Shop repair orders are only "spot checked" to evaluate performance against established standards. Although the program calls for cost reports to be made by the fiscal office with statistical work only accomplished by shop personnel, these reports are compiled in





their entirety, except for signature, in the Public Works shop. "Internal controls and checks", available from an independent review, are not present in such a system. The Comptroller is usually not informed of transportation discrepancies.

U. S. Naval Ammunition Depot - The Commanding Officer, the Comptroller, the Public Works Officer and other responsible personnel take an active role in the management of transportation assets.

Though transportation is financed from appropriated funds the Depot has successfully substituted "ends" for "means" as the focal point of financial planning and control by effectively implementing the program. Required funds for the transportation function are estimated on the basis of a dynamic requirement which is tied to information produced by the reporting system. Proper internal checks have been incorporated which insure that the various cost elements are properly allocated and controlled. As he makes required fiscal reports the Comptroller subjects transportation management to independent review.

This activity maintains and operates its vehicles economically; it appears that proper management procedures are employed and realization of program efficiency and economy objectives are achieved by all organizational elements concerned.



## CHAPTER V

### SUMMARY

#### CONTROL CONCEPT

The concepts of management, executive, internal and technical control have been analyzed as they are expressed differently by different authorities; within these concepts common themes recur. Scientific management requires well-defined objectives, planned programs, and controlled performance. This controlled performance requires the establishment of standards, the measurement of performance and the correction of deviations. Control, exercised through people, is not a self-contained entity but an inherent part of the management process - a power of force directed toward ensuring the accomplishment of organization goals.

#### TECHNICAL CONTROL

This broad spectrum of control is exercised in the Navy by the Comptroller of the Navy who, with technical authority, directs the Naval Establishment in financial matters which include budgeting, accounting, program analysis and auditing. The Chief, Bureau of Yards and Docks, exercises similar technical control in the management of Navy transportation. While this Bureau is responsible for the overall transportation program, a joint effort by the Bureau and the



Office of the Comptroller has produced a statistical accounting system within which costs are separated and assigned to end products. Included also is a set of standards against which performance should be measured.

Through the proper use of controls generated by the system diligent managers can efficiently and economically manage assigned transportation assets.

#### INDUSTRIAL FUND

This financing requires full attention of all management personnel to properly control costs. Management objectives are (1) more responsive performance to the needs of the buyer which requires effective programming and budgeting; (2) greater flexibility in varying the work force which results in lower unit costs; (3) forced incentive to efficiency and economy through buyer's position as critic; and (4) facilitate increased cross-servicing to other agencies, avoiding unnecessary duplication.

#### PUBLIC WORKS TRANSPORTATION CENTER

Marriage at the lowest echelon joined the single function of transportation to the industrial fund concept to form the Public Works Transportation Center. The center is dynamically and effectively managed. Contracts for services let by Public Works Transportation Center provide for





maintenance and overhaul of Air Force Jet fuel tankers and commercial bus service.

#### ANALYSIS OF COST CONTROL

A detailed analysis of vehicle maintenance and operating cost control at selected activities disproved the author's premise that Industrial Fund managers would naturally operate more economically than other managers operating under appropriated funds. The study has certainly revealed that individual managers, regardless of their environment, can compete with all contemporaries if they diligently apply themselves to the task.

Cost and mileage data available from program reports form a sound basis for the intelligent, economical management of the transportation function provided that total cost is considered on a cost per thousand mile basis. Considerable variation in total cost reflects the degree of management attention given to the various elements.

#### CONCLUSIONS AND RECOMMENDATIONS

If the transportation function is to be accomplished most efficiently, managers, at all echelons, must give it full and continuing attention. To objectively evaluate resulting costs will require exhaustive studies in the areas of maintenance, operating costs, vehicle utilization,



preventive maintenance and replacement. By vigorous soul searching in the light of operational commitments, the manager must determine whether long run economies might accrue should he decide to contract for full or partial requirements of a vehicle fleet in lieu of maintaining one of his own.

As an added incentive to efficiency the various management bureaus should require field activity budget requests for automotive transportation funds to be supported in part by data such as estimated maintenance based on projected utilization expressed in total miles at cost per mile rates established from evaluation of costs incurred.

IN THE FINAL ANALYSIS "ECONOMY IN OPERATIONS BOILS DOWN TO THE INITIATIVE AND PRIDE OF THE INDIVIDUAL MANAGER CONCERNED"!!



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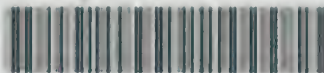






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